Soil Conservation

December 1977

U.S. Department of Agriculture

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A New Chance to Heal the Land

From the Administrator

The new surface mining law is good news for SCS, conservation districts, and other concerned groups working to improve land and water quality.

The Surface Mining Control and Reclamation Act of 1977 provides protection for important agricultural land and establishes a program to reclaim abandoned coal mined land.

SCS and conservation districts have sound experience in mined-land reclamation. SCS has developed plants that grow on mine spoils, conducted soil surveys, drawn up conservation plans, recommended engineering techniques, and advised on water-quality problems. Districts have emphasized the need for technical and cost-sharing assistance, reviewed plans and programs, and in some cases actually carried out the reclamation with their own equipment and crews.

Mine operators and State agencies will need data quickly, especially about prime farmland. We already are accelerating soil surveys and the prime farmland inventories based on them. SCS State conservationists already are helping address prime farmland requirements in mining permits. Plant materials centers are stepping up their search for plants that grow on land disturbed by mining.

The 1977 law also calls for States to enact and enforce programs to regulate closely the future surface mining of coal.

Many States already have surface mining laws and active voluntary and regulatory reclamation programs. SCS is helping State and Federal agencies develop reclamation standards that meet the requirements of the new law. We also will help train the people who do the mining and reclamation work and the people who will review it later.

Landowners as well as mine operators will need professional assistance during reclamation. SCS is ready to help them.

Districts and SCS need to review priorities for mined-land reclamation, and help design coordinated programs that are specific to each site's physical condition, adjacent land uses, and landowner objectives.

America must harvest its coal resources to meet energy demands. Under the new law, SCS and districts will help heal the scars of the past and assure that new mining operations will not endanger public health, safety, and welfare and the rural landscape. It is a big challenge, but an important opportunity.

Mel Davis

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Cover:
From 1937 to 1977—changes can be seen in farm country in southern Pennsylvania as conservation practices are installed on the land. See pages 11 through 14. (Photo, Donald C. Schuhart.)

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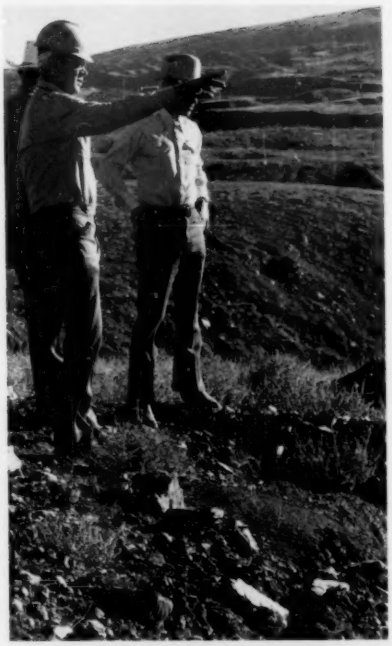
Revegetation in the Rockies

by Josh Whetzel
and Charles Hogelin

Beginning with a soils and vegetation inventory, a Colorado mining company developed a conservation plan that includes land reclamation and range management.

At the Edna Mine site, the growing season is about 120 days and the average precipitation is 17 inches a year.



District supervisors view reclamation work at the mine site.

Revegetating mining sites at high elevations in the Rocky Mountains is difficult; but with a conservation plan and perseverance, a Colorado mining company is reclaiming the land.

The Pittsburg and Midway Coal Mining Company is revegetating at its high elevation strip mine near Oak Creek, Colo. Its Edna Mine is situated at an elevation of 8,000 feet, with a growing season of approximately 120 days and an annual precipitation averaging only 16 to 18 inches.

In fall 1973, the mining company asked the Routt County Soil Conservation District (SCD) Board of Supervisors and Soil Conservation Service personnel to view the mine site and operation and to make recommendations for equipment, seedbed preparation, and seed mixtures of grasses, forbs, and shrubs for revegetation.

The SCS plant materials center at Los Lunas, N. Mex., developed seeding mixtures of native and other adaptable species suited to the Edna Mine site. In fall 1974, promising species of grasses and forbs were planted in small test plots on the graded mine spoil and in spring 1975, several test plots of trees and shrubs were planted.

In order to organize Edna Mine's land use activities, the mining company asked SCS, through the Routt County SCD, for assistance in developing a conservation plan. In fall 1975 as the first step toward developing the plan, SCS inventoried the soils and native vegetation of the areas to be mined. The soil survey provided information about soil location, depth, texture, pH, conductivity, and permeability. The vegetation inventory listed plants by specific sites and the estimated total annual production.

In early 1976 after completing the inventory, SCS and mining company personnel developed a conservation plan which included land reclamation and range management. The company used the soil survey to identify good sources of topsoil which could be saved during the mining operation. Using the vegetation inventory, the company selected native species such as western wheatgrass, slender wheatgrass, mountain brome, big bluegrass, green needlegrass, serviceberry, chokecherry, and antelope

The soil survey identified good sources of topsoil which could be saved during the mining operation.

bitterbrush to be included in seed mixtures planted at specified sites.

Since the company wanted to use the reclaimed land for domestic grazing, range management techniques were included in the conservation plan. Newly seeded areas are protected from domestic grazing by fencing which does not interfere with mining operations. After the plants are established and animals begin grazing, no more than 50 percent of the current year's growth will be grazed.

Mr. Whetzel is reclamation specialist, Edna Mine, Oak Creek, Colo.
Mr. Hogelin is district conservationist, SCS, Byers, Colo.

Conservation Has a Leading Role in Reclamation Act

New Federal rules governing surface mining took effect in August when President Carter signed the Surface Mining Control and Reclamation Act of 1977.

Mining companies strip 48,000 acres of land a year, and Public Law 95–87 will require them to restore surface mined land to a condition capable of supporting its previous use.

Reclamation involves planning and site preparation before mining, stabilization and conservation during mining, and restoration when the mining is finished. Restoration includes grading the land to its original slope, reconstructing the soil, planting vegetation for cover, building terraces, and installing other conservation measures to stabilize the soil and control erosion. The Soil Conservation Service, through conservation districts, will help surface mine operators develop and apply their reclamation plans.

Public Law 95–87 also has special requirements for mining on prime agricultural land. Operators will be permitted to mine prime farmlands only if they prove that they can reclaim the land to its previous level of productivity. They must also follow strict soil reconstruction standards.

A company applying for a mining permit that involves prime farmland must present a soils map that identifies all units of prime farmland in the area to be mined. Soil surveys help determine prime farmland and can be used as a guide to reconstructing the soil after mining. The surveys must, however, be prepared in accordance with the National Cooperative Soil Survey.

For the first time, under the new law, farmers, ranchers, and other surface owners will be able to veto new surface mining operations on their land even if they do not own the mineral rights, giving them a stronger say about mining operations that may disrupt their homes or livelihoods.

The law also authorizes USDA, through a voluntary program, to provide technical and financial assistance to rural land users on the 1 million acres of presently unreclaimed coal mine land. Federal cost sharing for the "abandoned" lands will be provided under long-term contracts based on conservation plans. Cost sharing will average 80 percent, but higher rates will be authorized when needed for reclamation that would benefit the public. The Soil Conservation Service, through the conservation districts, will help rural land users develop and carry out the conservation plans.

To fund abandoned mine reclamation, mining companies will pay fees for surface-mined coal and coal from underground mines for the next 15 years—35 cents per ton on surface-mined coal (10 cents for lignite coal) and 15 cents per ton on coal from underground mines.

Implementation of the new law will be phased in over the next 3 years as States develop regulatory programs that meet the requirements of the act. In States that do not develop adequate State programs, federal regulatory programs will be implemented.

The Office of Surface Mining, U.S. Department of the Interior, will administer the law.

Abridged remarks made by Mr. Bagley, St. Joseph, La., farmer and president, National Association of Conservation Districts (NACD), at the Annual Conference of SCS State Conservationists, San Diego, Calif., September 1977. Mr. Bagley's appearance marked his last as NACD president before a State conservationists' meeting.

Soil Conservation Today and Tomorrow

by George R. Bagley

There has been nothing quite like the creation of districts in the history of our Nation. We invented a whole new series of local governments charged with preventing erosion and conserving soil, and they rapidly proliferated throughout every State, Puerto Rico, and the Virgin Islands. America can be proud of her 3,000 conservation districts and the 17,000 men and women who are stewards of their affairs. America can be proud of the record of conservation established on the land through districts and the Soil Conservation Service, and through related and cooperative efforts of others, that have helped to repair the ravages of past neglect and misuse.

Over the past four decades, conservation districts have grown in stature as well as geographical coverage. In response to the change in interrelationships between natural resource problems, our programs have evolved in many new directions. We have placed more emphasis on managing water on farms and small watersheds. We've adapted conservation technology to assist with recreational and economic development in rural areas. We've used the principles and techniques of erosion control to help reclaim strip-mined lands. We've developed programs to assure control of erosion and sedimentation at construction sites. We've helped develop procedures to coordinate the con-

Broad-based terraces are designed to accommodate wider farm equipment.

servation planning and treatment of intermingled public and private lands.

Districts formed organizations at the area, State, and national levels during these years in order to help accomplish their purposes. We sought assistance from every available source, and secured funds and employed personnel to supplement those furnished by SCS and other cooperating agencies. Repeatedly, State legislatures and county governments have provided districts with additional authorities and fresh resources to strengthen our work.

Today, districts are better financed, more powerful, more effective, and more representative of their constituencies than ever before. We have a broader view of our responsibilities. We are stronger and more independent.

And we are more controversial. Contrary to what some people think, soil conservation has always been somewhat controversial. Districts did not spring into being automatically. There was debate aplenty over the early years, and it was hot debate. The idea of soil conservation implied dissatisfaction with the status quo. That's always controversial, and some of the battles over district organization were fierce.

After these stormy beginnings, soil conservation assumed the stature of motherhood and the American flag. Everybody seemed to be for it. The backlog of work on the farms and ranches of the country was enormous, and district leaders and their helpers got down to the job.

Conservation practices must be responsive to changes in agricultural technology . . . heavier, larger equipment means that the design of structural practices must be modified.

But it didn't take long for districts to recognize that proper soil conservation involves more than farm planning, contour stripcropping, and timber stand improvement. It also involves the relationship between rural and urban areas, between economic existence and resource preservation, between private property rights and public interests, and between the people and their government.

Increasingly, therefore, conservation districts have spoken out on major issues of concern. They have expressed their views on land use planning and the appropriate roles of the various levels of government in this highly controversial process. They have defended the use of water management structures, including reservoirs and channel modifications, where their overall benefits appeared to outweigh disadvantages. They have spoken against blanket Federal regulations dealing with land use and wetlands preservation. They have spoken out in favor of accelerated efforts to control water pollution from land disturbing activities. And they have spoken out forcefully on a wide variety of issues affecting the public lands of the Nation.

Districts have tried to stand for what they believe is right, and for what they believe to be a balanced, commonsense approach to conservation. They have not always agreed with environmentalists about some of their conclusions. Instead, they have tried to balance the need for economic existence with that for environmental protection.

Controversy over soil conservation and conservation districts has tested and strengthened our mettle. It has helped make the public aware of the choices we face and the issues that we must confront. And it has helped prepare us for the challenges we face today as conservationists. We are at an important crossroads in the history of conservation and the directions that we take now will set the course for soil conservation tomorrow.

Top, a lake in Kentucky, which was once a coal strip pit, now supports fish. Bottom, a small debris basin traps sediment at a construction site in Virginia.

We've used the principles and techniques of erosion control to reclaim strip-mined lands and we've developed programs to control erosion and sedimentation at construction sites.

Three years ago, we warned the Nation that releasing land previously held back from production for agricultural use could lead to vastly accelerated erosion. A year later, our Great Plains Committee reported widespread and promiscuous plowing of grasslands. SCS reported that more intensive use of existing cropland and conversion of lands to more intensive cropping was resulting in dangerously high erosion levels in many parts of the country. This year, dust storms swirled through the Plains and across the East to the Atlantic Ocean. Terraces and contour strips have been plowed out in many cases. Windbreaks have been removed.

Many of the predictions of SCS and NACD about erosion damages, despite efforts to achieve "production with protection," as the slogan goes, have come true.

The key issues in conservation districts that I see for today and tomorrow are:

Priority establishment

The days of first-come, first-served, wall-to-wall approaches to conservation are numbered. Setting priorities for conservation planning and treatment is primarily the responsibility of conservation districts. Given limitations on manpower and other resources, it will always be impossible to do everything. In many districts, intensive effort is being made to determine which problems are the most critical and to concentrate available resources on those problems. But, in far too many districts, the program adopted each year is a repeat of what was done the previous year.

Conservation districts and SCS need to take the initiative together for a fresh inventory of erosion, sediment, forestry, water conservation, and wildlife problems in each district today to serve as a basis for the district officials' establishment of priorities.

Adequate technical assistance

The problem of priorities goes beyond the exercise by districts of their responsibilities under Memorandums of Understanding with USDA and other agencies. Increasingly, large amounts

Two areas that districts and SCS consider when setting priorities are forestry and wildlife habitat needs.

of time of technical personnel assigned to districts are consumed by activities not subject to district priority assignment.

For a variety of reasons, the amount of technical assistance available to districts for assistance in establishing conservation measures on the land has shrunk. Personnel ceilings, inflation, paperwork, and additional mandated responsibilities have combined to diminish time available to help landowners in the field.

Current efforts by SCS to reduce paperwork and get technicians back in the field are to be applauded. Other means of supplying needed technical services should be explored. Districts need to expand their own technical staffs to help fill the gap. Districts need State and local monies as well as Federal monies to do the job.

Onsite technical assistance has been the key to much of the success of district programs. This insures that conservation treatment is tailored to the problem, in the conservation plan, and that sufficient encouragement and assistance can be given to assure completion of planned measures.

Improved planning and followup procedures

Conservation plans are the basis of our work because they match conservation treatment with land capabilities. Plans should be comprehensive enough to insure that all aspects of land treatment fit together in the overall management scheme and all resource needs are taken into account.

Conservation districts and SCS need to take the initiative together for a fresh inventory of erosion, sediment, forestry, water conservation, and wildlife problems.

The basis for these plans is soils capability. It is custom tailoring for the individual land owner or operator. The conservation plan is the biggest sales package SCS and districts have going for them.

Whatever improvements may be made in conservation planning, they will come to naught without adequate followup. Here is where the district and the technical agencies assisting them share responsibility. Once a plan is prepared, specific attention should be given to steady, persistent encouragement of application over the years.

Updated conservation measures

Conservation practices must be responsive to changes in agricultural technology, economics, and emerging conservation objectives. Heavier, larger equipment means that the design of structural practices must be modified. Growing emphasis on reduction of pollution means that the effects of erosion control measures on water quality must be determined. Conservation tillage systems may make some conservation measures less important as technology progresses.

An upgraded research and development program to test and adapt conservation measures to present-day conditions and objectives is sorely needed.

Improved cost sharing

The principle of public investment to share the cost of establishing conservation measures that benefit the public more than individual landowners has long been accepted. But in too many cases, programs have combined objectives of conservation and income augmentation, with resultant confusion. Too much emphasis has been placed on short-term practices and too little on permanent, enduring conservation measures.

The best approach, we remain convinced, is to tie together technical assistance and cost sharing through

Left, SCS employees provide varied technical help to farmers and ranchers. Below, the basis for conservation plans is soils capability.

Onsite technical assistance has been the key to much of the success of district programs. It insures that conservation treatment is tailored to the problem.

long-term contracts. This helps assure step-by-step accomplishment of all needed measures in accordance with an appropriate plan and schedule.

Maintenance of conservation measures

Once conservation practices have been installed, what can be done to insure that they will continue in use over the years? Should there be a requirement that practices be maintained, or, if modified, replaced with something of equal value in conserving soil and water resources?

Environmentally sound projects

There can be no question that special projects sponsored by conservation districts, such as watershed and resource conservation and development projects, should be planned and carried out in a way that enhances the overall environment. This requires multidisciplinary planning, adequate public participation, recognition of all economic and environmental costs and benefits, and maximum use of nonstructural measures in dealing with water management—including land treatment, floodways, and flood plain protection.

The legislation is on the books to accomplish these objectives and some progress is being made. But nonstructural work will not be accomplished if funds are not made available. Land treatment will not be accomplished to the degree desirable if provisions authorizing long-term contracts are not funded.

These are some of my thoughts on the challenge that districts face today. These issues and others are being studied now by NACD's Committee on District Outlook. Out of this study, and the ideas that you can contribute at this meeting, will come some recommendations for action. We need a new Conservation Agenda for the eighties.

I don't believe that anybody is going to come up with a wholly different approach to the problem of soil conservation. Basically, our program is sound. Many of the criticisms that are being voiced today are similar to those that have been made within NACD for years. So are many of the prescriptions for change.

But the time is ripe for a new national commitment to the subject. The time is ripe for a new national determination to do those things—at the local, State, and Federal levels—that will help identify our critical soil conservation problems and concentrate on efforts to achieve the most permanent solutions possible.

Never has there been more interest in conservation, and soil and water conservation in particular. Let's benefit from this public interest and let it help us reaffirm the best in our programs and make the further changes that will enable us to conserve our land's resources for today and tomorrow.

Written on the Land

Aerial photos of a farming community in Pennsylvania reveal the story of steady environmental improvement over the last four decades of the conservation movement.

Top, in 1937 photo, rectangles and triangles of land, with straight furrows in fields, give no hint of the steep, rolling country below in Lancaster County, Pa. Erosion of topsoil was heavy during rainstorms. Bottom, in 1977 photo, cropland has been shaped to follow the contour of the land. Natural drainageways are in sod to prevent gullying.

In 1937, an aerial photographer on a mapping assignment for the U.S. Department of Agriculture took a picture of some 2,400 acres of farm country in southern Pennsylvania. Located around the village of Chestnut Level in Lancaster County, it was typical of many American farm communities of the 1930's. Fields were plowed in straight lines, even up and down hillsides, just as they had been since the 18th Century. When it rained, there were heavy losses of topsoil, amounting to many tons of soil per acre.

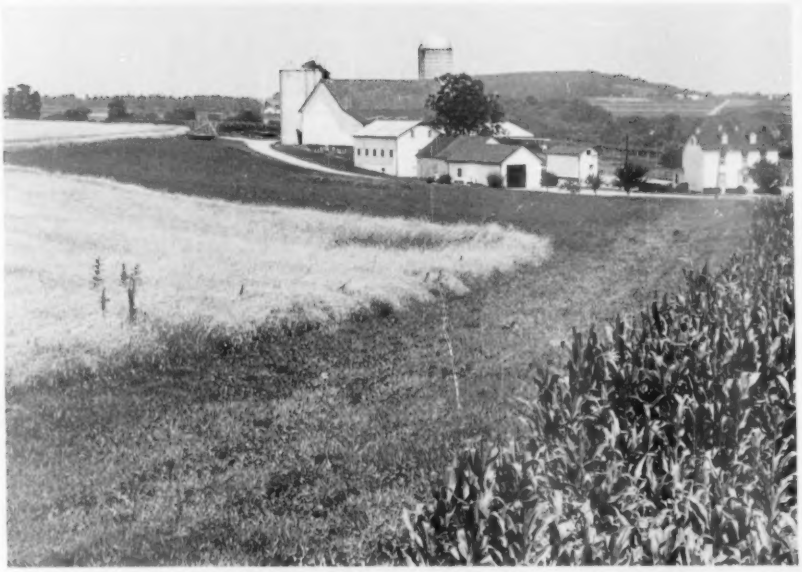
But 1937 was also the year of the founding of the Lancaster Soil and Water Conservation District, one of the first such local districts in the United States. The Soil Conservation Service, a USDA agency established 2 years earlier, started providing technical help to farmers through the district.

Farmer after farmer signed up voluntarily as a "conservation cooperator," and farm by farm, the look of the land began to change. A new vocabulary of conservation farming began to be written on the land: countour plowing, stripcropping, grassed waterways, crop rotation, and terracing. Today the Lancaster District is still in business, along with some 2,950 other soil conservation districts across the country; and a recent aerial photo of the same farming community reveals the extent of the change that conservation farming has wrought on the American landscape.

Everett Kreider (on tractor), owner of two farms near Chestnut Level, discusses plans with Abner Houseknecht, a district employee. Before he retired from SCS, Houseknecht helped develop many of the farm conservation plans now applied in the area.

What is seen as a pattern of curves from the air is revealed on the ground as strips of corn alternating with alfalfa. Stripcropping helps keep soil from washing down slopes.

Kreider, who signed up as a district cooperator in 1946, says he practices soil conservation "to protect my investment in my land."



Grassed waterway of reed canarygrass and tall fescue moves stormwater safely off field without taking the soil with it. The light grain on the left is a strip of wheat; a strip of alfalfa is alongside the barn and hybrid corn is growing on right.

Farm worker combines strip of wheat near Chestnut Level. Woodlands behind field, like other woods in area, have been left virtually untouched since the first aerial photo was taken in 1937.

This fall the Soil Conservation Service mailed 600 newspaper and magazine photo editors this pictorial record of what has happened to 2,400 rolling acres of Pennsylvania farmland during the last 40 years.

Photos, Donald C. Schuhart.

Palouse farmers are turning to best management practices to control soil erosion and improve water quality.

Clean Water: A Palouse Priority

by Verle G. Kaiser
and Robert F. Tegner

Sediment from upstream Palouse farmland forms bars at the mouth of the Palouse River. The islands are grazed by cattle.

The Palouse is an area of tremendous grain production, great beauty, and massive, widespread erosion.

The Palouse is a distinct area in southeastern Washington, reaching into Idaho and Oregon. Through much of this land winds the river called Palouse. It flows from the highest peaks of the Coeur d'Alene Mountains of northern Idaho through steep, forested hills. Then it breaks out into the rolling terrain typical of Palouse country. Downstream, it becomes trapped in a deep canyon and plunges over a 200-foot precipice called Palouse Falls, and eventually it empties into the Snake River, which discharges into the Columbia.

From its source to its mouth, the Palouse River travels about 150 miles, draining 2 million acres in eight counties in Idaho and Washington. Nearly 60 percent of the Palouse basin is cropland. The extremely deep loess soils are among the most productive in the world for growing wheat, barley, peas, lentils, and other field crops. In fact, wheat yields often top 100 bushels per acre—without irrigation.

Palouse scenery, characteristics, and problems are products of what has happened there over the years. In ancient times, there were basaltic flows, deep deposits of windblown soils, and lengthy periods of undisturbed grass cover that produced a maximum build-up of organic matter and fertility.

Before the early 1800's, the Palouse was Indian land. Although Indians didn't live there, they came to gather food and graze their large herds of horses. For the most part, they left the land in its natural condition.

Settlement by pioneers began in the 1860's. At first they raised cattle and hogs, but it wasn't long before they discovered that the fertile, virgin land produced excellent yields of grain.

Soon, grass cover was stripped from the steep, erodible slopes. Soil was pulverized and made even more erodible by plowing. Natural waterways were plowed out. Summer fallowing in the higher rainfall areas saturated the soil and increased runoff. The hills were cultivated up and down instead of on the contour, and no stubble or mulch was left to protect the soil.

The result was erosion at a rate not exceeded anywhere in the Nation: An annual loss of 20 million tons of soil from more than 1 million acres of cropland was not uncommon.

In 1930, the Palouse Erosion Experiment Station was set up north of Pullman, Wash., and later in the decade, the Civilian Conservation Corps and the Soil Conservation Service helped farmers repair erosion damage

Seedbed is prepared for planting winter wheat. The Palouse is an area of tremendous grain production. Wheat yields in the Palouse basin often top 100 bushels an acre.

and install preventive measures. In 1940, the first soil conservation district in the State, the North Palouse, was established.

Cost sharing for conservation measures was started, but war, surpluses, allotments, economics, and politics have thwarted significant progress toward solving the Palouse erosion problems.

Now, because of the Federal Water Pollution Control Act Amendments of 1972, erosion must be halted to keep runaway soil out of streams, rivers, and reservoirs.

One vivid example of sediment damage caused by Palouse erosion is evident where the Lower Monumental Dam on the Snake River backs water up to the mouth of the Palouse River.

The reservoir first filled with water in 1969. By 1970, huge sediment bars appeared in the reservoir, formed by the millions of tons of topsoil stripped from Palouse farmland. By 1973, even the upper part of the mouth of the Palouse River began filling with sediment. Today, the sediment bars have evolved into islands that are used for grazing cattle, and sediment continues to pour into the reservoir.

Because of the antipollution law, however, new forces are working to control erosion. SCS, the Forest Service, and the Economic Research Service have completed a study of the Palouse River basin requested by the State Department of Ecology (DOE), which administers the law in Washington.

The State Conservation Commission is working with DOE and conservation districts to promote the best management practices for conserving soil in the dryland farming area. Through local water quality committees, districts and farmers are determining the conservation practices best suited to specific areas. SCS and the Washington State University Cooperative Extension Service have assigned employees to work with the committees and are cooperating with DOE and the commission in an information program supporting the committees.

There is urgency in the effort. The law calls for completion of water quality planning by 1978 and for fishable, swimmable waters by 1983.

Both soil and time are a-wasting.

Mr. Kaiser, formerly State agronomist, SCS, Spokane, Wash., is now retired.
Mr. Tegner is public information officer, SCS, Spokane, Wash.

Surface residue is weighed during an evaluation of fall field conditions before winter runoff season.

Sediment and straw washed from bare land give evidence of the erosion problem in the Palouse basin.

In sharp contrast to the deep, fertile soil of the Palouse is the channeled scabland which borders the Palouse in the North.

Erosion along Lake Superior after a spring thaw contributes to the pollution problem.

Improved Water Quality for Lake Superior

by David A. Zarkin

Streams that feed southwestern Lake Superior may never run blue—but the Red Clay Project is aimed at helping lessen water-quality problems.

Red rivers churn through the countryside along the southwestern tip of Lake Superior. These waters eventually spill into the lake—the world's largest body of fresh water—making huge fanlike patterns of red at the points of entry.

The red is produced by erosion from the area's native red-clay soil, left behind by Lake Superior eons ago as its waters receded. The soil is agriculturally productive but highly erodible. It is a shrink-swell soil that fractures easily when disturbed and then moves into streams and rivers. Once in the water, it remains suspended for long periods.

The U.S. Environmental Protection Agency is funding three research and demonstration projects under Section 108 of Public Law 92–500. The projects are designed to come up with new methods and techniques for eliminating or controlling pollution in watersheds of the Great Lakes.

The Red Clay Project is one of the projects aimed at reducing soil erosion to keep hard-to-manage soil out of Lake Superior. The project covers five counties in Minnesota and Wisconsin. The prime contractor for the project is the Douglas County Soil and Water

A roadside seeding demonstration is conducted as part of the Red Clay Project. A grass-legume seed mixture is applied with a wood-fiber mulch by a hydroseeder. The seedbed is located at a badly eroded site on the red clay soils in Douglas County, Wis.

A well is installed on Mel Paetznick's farm in Minnesota as part of the farmer's overall conservation plan. Paetznick has a long-term agreement with the Red Clay Project and the Carlton County Soil and Water Conservation District.

Conservation District in Wisconsin. Four other conservation districts are involved, along with many cooperating agencies and institutions.

Total erosion control may be neither feasible nor achievable. "We'll never make the streams run blue," said Project Director Steve Andrews. "That's out of the question." Instead, the project will try to show that economically practical methods can be developed for improving water quality. Data that become available through the project should be helpful later in planning and implementing pollution control efforts.

Working through their local soil and water conservation districts, public and private landowners participating in the project develop conservation plans with assistance from the Soil Conservation Service. County Extension agents are also available to help. Cost-sharing assistance is provided to help landowners install planned practices.

Response has been positive, particularly among farmers. Agricultural runoff—from unchecked livestock grazing, for example—is a major pollutant. Cattle travel up and down streambanks, disturbing the soil and making paths in the ravines. Fencing paid for by the project is keeping cattle on the upland, thus preventing some erosion of the creek banks. Other land management practices—such as pasture seeding, new pasture development, and installation of diversion ditches—are holding soil in place.

Farmers John Lunda and Robert Meliska, of Bayfield County, Wis., are among those getting help through the project in installing measures to keep cattle in pastures rather than along creek banks. "I wanted to do these things on my land anyway," said Lunda. "I wish all farmers in the area would join up," Meliska agreed, mentioning the cost-sharing aspects of the project as a major advantage. "I couldn't do it on my own," he added, "because of the high cost."

Roadbank erosion also contributes heavily to the sediment load. Project officials use shaping, seeding, and other conservation practices to prevent soil from washing away. Studies will show land where heavy soil losses can be expected, so highway engineers can avoid these areas in planning for road construction.

Since the Red Clay Project is a research and demonstration effort rather than an "action" program, it is still early for definitive results. Farmer Lunda, for example, has signed a long-term contract with the Bayfield County Soil and Water Conservation District through the project and will evaluate the effectiveness of his conservation work when his contract expires.

Preliminary data are coming in, however. Project workers are monitoring water quality to determine the impact of conservation management practices on agricultural lands. Another project survey is measuring the impact of stabilization efforts on roadsides and streambanks.

The project's success will be determined ultimately by the willingness of farmers and other landowners in the project area's soil and water conservation districts to develop and implement conservation plans on their land.

Mr. Zarkin is extension information specialist, Agricultural Extension Service, St. Paul, Minn.

Dry Classrooms for Wet Valleys

by William H. Dempsey

At Salyer Elementary School a 2½-foot high, reinforced concrete floodwall was installed as part of the RC&D measure.

Runoff from eastern Kentucky's steep hills regularly flooded some schools in the Big Sandy RC&D Area. Conservation assistance and planning now have made classrooms safer—and drier—places in which to study.

"It's almost a choice between locating on a flood plain and tearing down a mountain every time we build something," said Ollie J. Arnett, chairman of the Big Sandy Resource Conservation and Development (RC&D) Area Council.

His subject is rugged eastern Kentucky. "These narrow valleys, steep hills, and sharp ridgetops severely limit residential, commercial, industrial, and transportation developments," Arnett explained.

He could have added "school developments" to his list.

For years, several of the older school buildings in the Big Sandy area have been hit with periodic floods. They are located in narrow valleys, directly in the path of water running off the surrounding mountains. After a heavy rain, schoolhouse floors may have water a few inches to over a foot deep.

Volume of water isn't the problem. "A flood is a flood," said James Newman, Chairman of the RC&D Community Facilities Committee, "whether it's an inch of muddy water in a school or a valley full of water." The problem is two-fold: How to protect existing schools from floodwaters and how to plan future school construction to minimize flooding hazards.

The Big Sandy RC&D Area has found some of the answers.

Johnson County's Porter Elementary School was a classic example of the consequences of building on a flood plain. Runoff from the hills behind the building sometimes overflowed the drainageway and flooded the school cafeteria. The County School Board turned to the Johnson County Conservation District for help. At least six other schools in the Big Sandy area, the board pointed out, had similar flooding problems.

District supervisors recognized the hazards. They joined school board officials in asking the Big Sandy RC&D Council for assistance, through the Soil Conservation Service, in solving Porter's flooding problems.

SCS engineers helped plan and design the RC&D flood control measure which included a sodded interception ditch, grated drop inlets, and a large, reinforced concrete conduit to carry water underground across the

Flood control measures at Porter Elementary include grated drop inlets (above) and a conduit which carries water across the schoolyard to a protected outlet (right). Top right, Jimmy Marcum (right), school principal, and Larry Delong, SCS district conservationist, inspect completed inlet.

school yard to a protected outlet in a stream channel.

In spring 1977, construction of the measure was about 90 percent complete when heavy rains caused widespread flood damage in the valley. However, the RC&D measure carried the floodwater away and the school reported only minor damages.

While assessing the effects of the heavy rainfall, School Official Leon Burchett said, "Without the flood prevention measure we would be shoveling mud and mopping up water in the cafeteria today—but it's dry."

Another school with a flooding problem—Salyer Elementary in Magoffin County—received similar help. At Salyer, construction has been completed on a floodway through what was a parking lot. A reinforced concrete floodwall about 2½ feet high was installed in front of the school building and a drainage conduit was installed between the floodwall and school building to remove water that would have collected there.

Field surveys are in progress at two other schools, and flood-proofing plans are going to be explored for three schools that have less severe problems.

Former Floyd County Superintendent of Schools Charles Clark feels that future flooding difficulties can be avoided by thorough, long-range site planning. He points to multimillion-dollar projects like Allen Central High in Floyd County and Johnson Central High in Johnson County as evidence that schools can be constructed in nonflood areas.

These projects were successful, Clark believes, because local decisionmakers received site selection assistance from SCS, the conservation districts, and the Big Sandy RC&D Area Council. The data provided and used in selecting sites included soil limitations or potentials and likely flooding hazards.

"We could have avoided some earlier construction mistakes," Clark added, "if we had requested this kind of service."

Mr. Dempsey is RC&D coordinator, SCS, Prestonsburg, Ky.

by Gordon S. Smith

Before conservation, part of the Lakehurst Naval Air Station was useless wasteland. Now it's a prize winner: for hunting, fishing, woodland, and wildlife.

Salvage Operation on Navy Wasteland

"A few years ago, the Navy considered 1,000 acres of its 7,412-acre Lakehurst Naval Air Station as useless wasteland," recalls Albert E. Newby, the station soil conservationist. Fire was a constant threat in this unused New Jersey pine barrens covered with pitch pines, scrub oaks, bogs, and swamp.

Now, conservation has converted the wasteland into a prize-winning woodland and wildlife area. "We have received several awards for this achievement," said Newby, "including the top Goodyear Conservation Award for the New Jersey-Delaware area."

After World War II, military and civilian station personnel formed a conservation club. Using their own money and working during their off-duty hours, club members began cutting new access roads and fire lanes. They also built dams on a small stream, creating new fishing sites in a series of three small lakes.

State and Federal fish and wildlife biologists helped with technical planning advice, experimental plantings, and pond stocking. The Soil Conservation Service tested new plant materials on eroding slopes and droughty soils. Gradually, fish and wildlife populations improved.

Newby, a former district conservationist with SCS, joined the station in 1963 as its first forester. Working with the SCS office in nearby Toms River, he drafted a conservation plan for the entire base. The plan included stabilizing bare, wind-blown areas and improving small ponds, managing wildlife food and cover plants, controlling erosion, and managing woodland. It also provided for a general upgrading of landscaping in the built-up sections of the base.

As one of the first steps in the plan, Lakehurst became a member of the local Ocean County Soil Conservation District. The district bolstered conservation efforts on the base by arranging for technical assistance from Federal and State resource agencies.

Fire control was top priority. "Without it," said Newby, "our plans for a wildlife conservation area would have been completely useless."

Five miles of gravel-based access roads were constructed and more fire lanes added. A 125-foot-wide fire lane along the entire outer boundary of the station was installed to block any fires from outside. Twenty-two small fire ponds were placed at strategic water source points along the new access roads.

Then, Newby began the process of removing fire-damaged trees. Those with pulpwood value were harvested annually by local bidders. Those that remained were destroyed by prescribed burning or were ground up and pushed into small piles for wildlife cover.

Next, the cleared areas were either seeded for a new stand of pine trees or seeded and managed as a wildlife food plot. Newby found that pitch pine makes the most successful stands at an average cost of $35 per acre. More than 400 acres have been seeded successfully during the past 3 years.

The new wildlife food plots, established in some of the cleared areas, are popular with hunters. "We have about 130 acres of these plots now," said Newby. Usually, they are 200 to 400 yards long and up to 150 feet wide.

SCS plant scientists have identified a number of food and cover-producing plants that can be established in this sandy soil. Most of these plants were tested at the SCS Cape May Courthouse Plant Materials Center in New Jersey, or on a 20-acre site at Lakehurst. Among the successful entries are sericea lespedeza, flatpea, deertongue, reed canarygrass, switchgrass, weeping lovegrass, and Kentucky 31 tall fescue. Shrubs planted along the borders of the food plots include autumn olive, shrub lespedeza, and bristly locust. The shrubs and grasses provide food and cover for

Below, Al Newby, soil conservationist at Lakehurst, found that pitch pine makes the most successful stands. Below left, members of the station's Conservation Club, as well as local people, find good fishing in the manmade ponds.

deer, pheasant, quail, and rabbits.

Under a new policy, the station issues $10 permits to anyone who wishes to come in and cut a cord of wood along the edge of the plot. The area cut may extend up to 50 feet back from the plot, thus providing the ideal cut-back borders recommended by wildlife experts. The permit fee helps support wildlife improvements on the station.

From the air, Newby's new food plots resemble a golf course cut through a wooded area. A hunter can walk from one food plot to another through only a few yards of trees. The Conservation Club issues a pocket-sized map of these plots.

The club also releases about 1,000 pheasant at the start of hunting season, with State Fish and Game people releasing another 700 to 1,000. Natural populations of both deer and quail are increasing.

Fishing is also a popular pastime. Large potential catches of trout, bass, bluegills, perch, bullheads, catfish, and pickerel inhabit the lakes in the conservation area. Every year, Fish and Wildlife Service specialists of the U.S. Department of the Interior stock these lakes. The original dams built by the club still exist, but SCS designs are ready for making structural improvements whenever budgets permit.

It costs $2 per person to hunt or fish on the station. This fee is also directed toward wildlife conservation improvements.

"Over the past 3 years, 2,650 military and 7,000 civilian hunters and fishermen have tried their luck here," said Newby. "Other visitors—more than 12,000 of them—include Izaak Walton League members, rod and gun clubbers, Scouts, and local retriever clubs, birdwatchers, and hikers."

Lakehurst captured two first place awards and two second place awards in the Department of Defense Natural Resources Conservation Program. Then it took the Goodyear Award. Al Newby is still wondering how to top that.

Mr. Smith is head, information staff, Northeast Technical Service Center, SCS, Broomall, Pa.

Meetings:

December	
4–6	American Society of Farm Managers and Rural Appraisers, Inc., Denver, Colo.
5–9	American Geophysical Union, San Francisco, Calif.
12–13	Erosion and Sedimentation Symposium, Chicago, Ill.
13–16	American Society of Agricultural Engineers, Chicago, Ill.
January	
3–6	Catfish Farmers of America, Atlanta, Ga.
8–12	American Farm Bureau Federation, Houston, Tex.
8–12	National Council of Farmer Cooperatives, San Francisco, Calif.
9–13	North American Game Breeders and Shooting Preserve Association, San Antonio, Tex.
17–21	National Wool Growers Association, Inc., Denver, Colo.
24–26	National Cattlemen's Association, New Orleans, La.
31–Feb. 2	Southeastern Section of the Society of American Foresters, Birmingham, Ala.
February	
5–9	National Association of Conservation Districts, Anaheim, Calif.
5–10	Society for Range Management, San Antonio, Tex.
17–20	American Association of School Administrators, Atlanta, Ga.
19–22	National Association of Manufacturers, Washington, D.C.
21–22	Southern Forest Institute, Inc., Atlanta, Ga.
26–Mar. 1	Land Improvement Contractors of America, Las Vegas, Nev.
26–Mar. 3	American Society of Photogrammetry, Washington, D.C.
28–Mar. 3	American Camping Association, Anaheim, Calif.

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